



Short communication

# Development of assessments for use on advanced pharmacy practice experiences<sup>☆</sup>

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## Abstract

**Objective:** To develop two comprehensive assessments related to common disease states seen in both inpatient and outpatient clinical settings.

**Methods:** Syllabi from the didactic therapeutics sequence were reviewed to identify topics on which the Advanced Pharmacy Practice Experience (APPE) student pharmacists were previously assessed.

**Results:** Fifteen major system and patient-care problem areas were identified as the most commonly experienced by APPE student pharmacists during an Ambulatory Care or Acute Care/General Medicine rotation. Nine content experts were invited to write ten multiple-choice questions in his/her designated content area(s) with an even distribution of inpatient and outpatient emphasis questions, practitioner role questions, and the preferred 7:3 ratio of application to analysis questions.

**Conclusions:** These assessments will be utilized as pre- and post-rotation quizzes to assess student learning on APPEs. Using these assessments, students may be able to self-assess and preceptors may be able to determine how well their rotation educates student pharmacists.

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## Introduction

One method of estimating student pharmacist knowledge, learning, and experience gained during an Advanced Pharmacy Practice Experience (APPE) is to administer an assessment before the start of and after completion of the rotation.<sup>1,2</sup> A search of the Education Resources Information Center and the MEDLINE database using search terms such as experiential, rotation, quiz, and assessment revealed

that some medical schools may use a similar assessment method for clerkship training as well.<sup>3</sup>

In a pilot program at the site of one investigator, pre- and post-assessments, consisting of 35 questions related to major diseases/conditions that student pharmacists were expected to encounter over the course of the rotation, were administered to 40 student pharmacists on a five-week Acute Care/General Medicine experience. Mean scores on the pre- and post-assessments were 58% and 71%, respectively, with an absolute difference of 13% [95% confidence interval, 9%–17% ( $p < 0.0001$ )]. Although this change in score may indicate student pharmacist learning, there were several limitations to consider. One limitation was the fact that the assessment was written by one person, the faculty investigator who precepted the APPE students. This is significant because the faculty investigator may subconsciously teach toward the assessment items and she was not necessarily a content expert in all disease states assessed on

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the quiz. Another limitation was the lack of structure in the design of the assessment, that is, there was no systematic distribution of assessment items across different Bloom's taxonomy levels,<sup>4</sup> practitioner roles, and it was only written for an Acute Care/General Medicine experience. These limitations would decrease the validity and generalizability of the findings.

### **Rationale and objectives**

Given the limitations that were found with the pilot assessment, the objective of this project was to develop two comprehensive assessments related to the common disease states seen in both inpatient and outpatient clinical settings.

### **Materials and methods**

The project was approved by the Institutional Review Board. Syllabi from the pathophysiology and therapeutics didactic sequence within the first three years of the professional curriculum at this college of pharmacy were reviewed by the four faculty investigators. The goal of this review was to create a list of the major system and patient-care problem areas that are taught and/or discussed with the student pharmacists during the five semesters of the pathophysiology and therapeutics didactic sequence. Following compilation of this list, the four faculty investigators, two ambulatory care practitioners, and two general medicine practitioners critically analyzed the areas to identify those commonly experienced by APPE student pharmacists on an Ambulatory Care or Acute Care/General Medicine rotation. Those areas considered to be commonly experienced were chosen as content areas to be included in the development of rotation assessments (quizzes).

Eleven Pharmacy Practice faculty members at the college of pharmacy were identified by the investigators as content experts for the system and patient-care problem areas. Four individuals served as experts for two major system and patient-care problem areas. Content experts were identified based upon current practice setting, practice experience, post-graduate training, and lecture responsibilities in the pathophysiology and therapeutics didactic sequence. Content experts were invited via e-mail to write ten multiple-choice questions for their pre-specified expertise area. All experts were asked in a voluntary manner to develop questions to assess student pharmacists' knowledge level and ability to manage patients in that particular area. If a faculty member was unable to write questions or did not feel comfortable participating, some other faculty member with expertise in the specific area was invited to write questions.

A psychometrician was consulted to ensure validity in the development process for the assessments. Based upon this consultation, content experts were asked to write questions that were equally distributed between inpatient and outpatient emphasis, specifically, five questions that

directly apply to the inpatient setting and five questions that apply to the outpatient setting. Questions that apply to both settings could be assigned to either, depending on the necessity to achieve five in both categories. Questions were to range from pathophysiology to clinical therapeutics. Additionally, content experts were asked to develop questions that assess student pharmacists' abilities in various aspects of patient care. The four faculty investigators involved in the creation of the system and patient-care problem areas reflected upon their responsibilities as a pharmacist in either the ambulatory care or inpatient setting. This resulted in the recognition of five primary roles of a practitioner that many student pharmacists are expected to be participating in on a daily basis during APPE rotations. More importantly, student pharmacists are expected to be functioning independently in these roles upon graduation. These five roles of a practitioner included the following: assessing disease states, evaluating current drug therapy, recommending new drug therapy, monitoring drug therapy, and educating patients and/or healthcare providers. Content experts were asked to further delineate their questions into these five roles of a practitioner. Two questions were requested for each role, one inpatient focused and one outpatient focused, as described above.

In addition to delineating questions according to practitioner role and clinical practice setting, questions were to be distributed according to Bloom's levels.<sup>4</sup> The pathophysiology and therapeutics didactic courses in the professional curriculum distribute questions according to Bloom's levels: recall/knowledge, application, and analysis.<sup>4</sup> Student pharmacists on APPE rotations are learning and developing their abilities based on practical experience. Due to this practical and hands-on experience, it was determined that student pharmacists on APPE rotations should be assessed at the application and analysis levels only. The ten multiple-choice questions were asked to be distributed between Bloom's application and analysis levels<sup>4</sup> at a ratio of seven application to three analysis.

Each multiple-choice question was to contain one correct answer and three incorrect distracters according to guidelines from Professional Examination Services.<sup>5</sup> Negative style questions such as, "Which of the following is NOT...", K-type questions, and questions that included foils of "all of the above" or "none of the above" were not considered appropriate. Content experts were asked to avoid submitting these types of multiple-choice questions. Writers were asked to indicate the correct multiple-choice answer; however, justification of the correct answer was not considered necessary.

Each content expert who voluntarily agreed to write questions was asked to submit his/her ten questions within three weeks. Following submission, each question was reviewed by at least two of the four faculty investigators to ensure the accuracy of content/answer selection, as well as accuracy to pre-specified question item delineation, including correct Bloom's level,<sup>4</sup> practitioner role, and

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